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PHILOSOPHICAL TRANSACTIONS.

Munday, Feb. 12. 166 $\frac{1}{2}$.

The Contents.

An Apendix to the Directions for Seamen, bound for far voyages. Of the judgment of some of the English Astronomers, touching the difference between two learned men, about an Observation made of the first of the two late Comets. Of a Correspondency, to be procured, for the finding out of the True distance of the Sun and Moon from the Earth. Of an Observation not long since made in England of Saturn. An Account of some Mercurial Observations, made with a Barometer, and their Results. Some Observations of Vipers, made by an Italian Philosopher.

An Appendix to the Directions for Seamen, bound for far Voyages.



Hereas it may be of good use, both *Naval* and *Philosophical*, to know, both how to found depths of the sea *without a Line*, and to fetch up water from any depth of the same; the following waies have been contrived by Mr. *Hook* to perform both; (which should have been added to the lately printed *Directions for Seamen*, if then it could have been conveniently done.)

First, for the sounding of depths without a Cord, consider *Figure 1*, and accordingly take a Globe of *Firr*, or *Maple*, or other light Wood, as A: let it be well secured by Vernish, Pitch, or otherwise, from imbibing water; then take a piece of Lead or Stone, D, considerably heavier than will sink the Globe: let there be a long Wire-staple B; in the Ball A, and a springing Wire C, with a bended end F, and into the said staple, press in with your fingers the springing Wire on the bended end: and on it hang the weight D, by its ring E, and so let Globe and all sink gently into the water, in the posture represented in the first *Figure*, to the bottom, where the weight D touching first, is thereby stopt; but the Ball, being by the *Impetus*, it acquired in descending, carried downwards a little after the weight is stopt, suffers the springing wire to fly back, and thereby sets it self at liberty to reascend. And, by observing the time of the Ball's stay under water (which may be done by a Watch, having minutes and seconds, or by a good Minut-glass, or best of all, by a Pendulum vibrating seconds) you will by this way, with the help of some *Tables*, come to know any depth of the sea.

Note, that care must be had of proportioning the weight and shape of the Lead, to the bulk, weight, and figure of the Globe, after such a manner, as upon experience shall be found most convenient.

In some of the Tryals already made with this Instrument, the Globe being of Maple-wood, well covered with Pitch to hinder soaking in, was $5\frac{1}{8}$ inches in diameter, and weighed $2\frac{1}{2}$ pounds: the Lead of $4\frac{1}{2}$ pounds weight, was of a *Conical* figure, 11. inches long, with the sharper end downwards, $1\frac{1}{8}$ inches at the top, and $\frac{1}{8}$ at the the bottom in diameter. And in those Experiments, made in the *Thames*, in the depth of 19. foot water, there passed between the Immersion and Emerfion of the Globe, 6. seconds of an hour; and in the depth of 10. foot water, there passed $3\frac{1}{2}$ seconds or thereabout: From many o

out

out a method to calculate, what depth is to be concluded from any other time of the like Globes stay under water.

In the same Tryals, made with this Instrument in the said River of *Thames*, it has been found, that there is no difference in time, between the submersions of the Ball at the greatest depth, when it rose two Wherries length from the place where it was let fall (being carried by the Current of the *Tide*) and when it rose within a yard or so of the same place where it was let down.

The *other* Instrument, for Fetching up water from the depth of the sea, is (as appears by *Figure 2.*) a square wooden *Bucket C*, whose bottoms *EE*, are so contrived, that as the weight *A*, sinks the Iron *B*, (to which the Bucket *C*, is fastned by two handles *DD*, on the ends of which are the moveable bottoms or Valves *EE*,) and thereby draws down the Bucket; the resistance of the water keeps up the Bucket in the posture *C*; whereby the water hath, all the while it is descending, a clear passage through; whereas, as soon as the Bucket is pulled upwards by the Line *F*, the resistance of the water to that motion beats the Bucket downward, and keeps it in the posture *G*, whereby the Included water is preserved from getting out, and the Ambient water kept from getting in.

By the advantage of which Vessel; it may be known, whether sea water be Salter at and towards the bottom, then at or near the top: Likewise, whether in some places of the sea, any sweet water is to be found at the bottom; the *Affirmative* whereof is to be met with in the *East Indian Voyages* of the industrious *John Hugh Van Linschoten*, who page 16 of that Book, as 'tis *Englished*, records, that in the *Persian Gulph*, about the Island *Barem*, or *Babarem*, they fetch up with certain Vessels (which he describes not) water out of the sea, from under the salt-water, four or five fathom deep, as sweet, as any Fountain water.

Fig. 2.

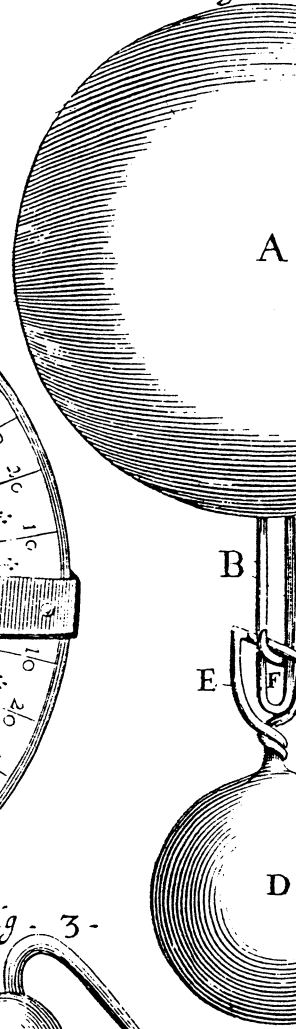


Fig. 1.

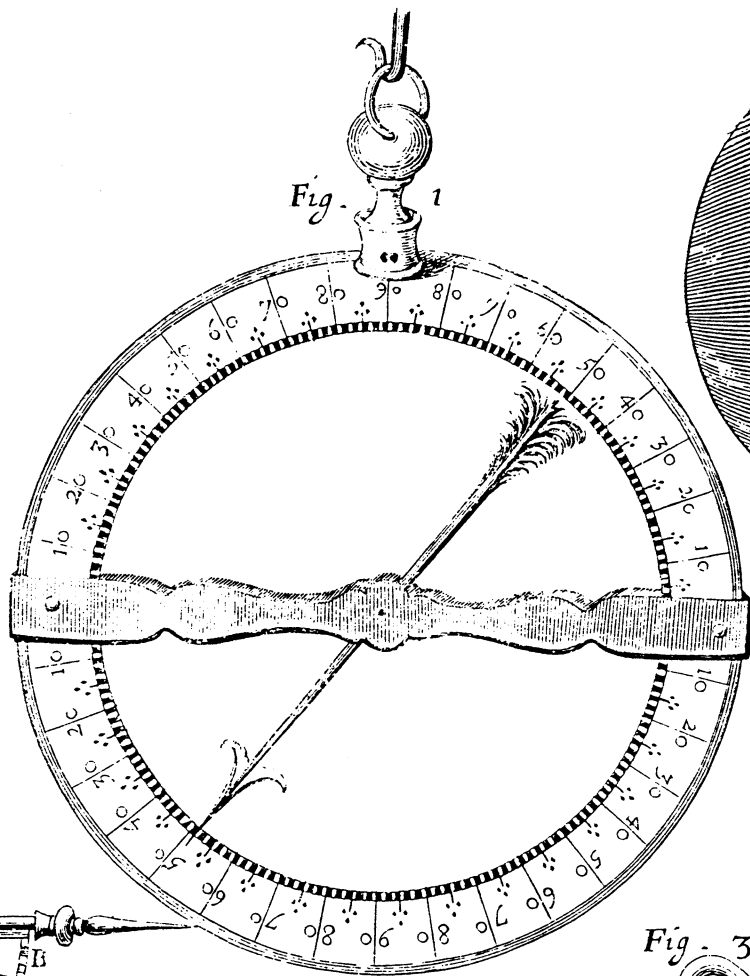


Fig. 3.

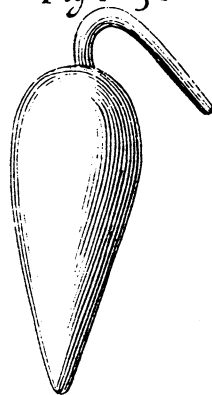


Fig. 4.

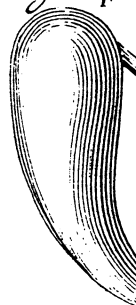


Fig. 6.

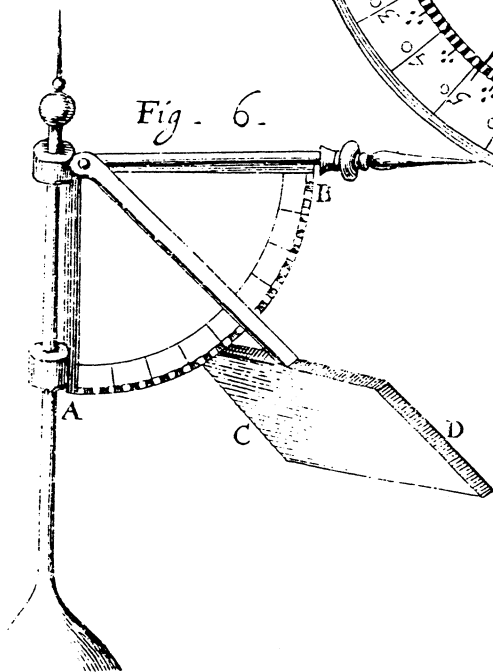


Fig. 2.

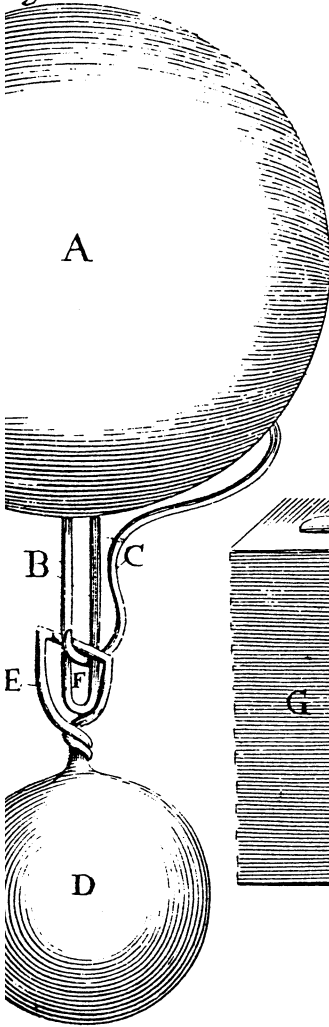


Fig. 8.

N^o 9 & 24.

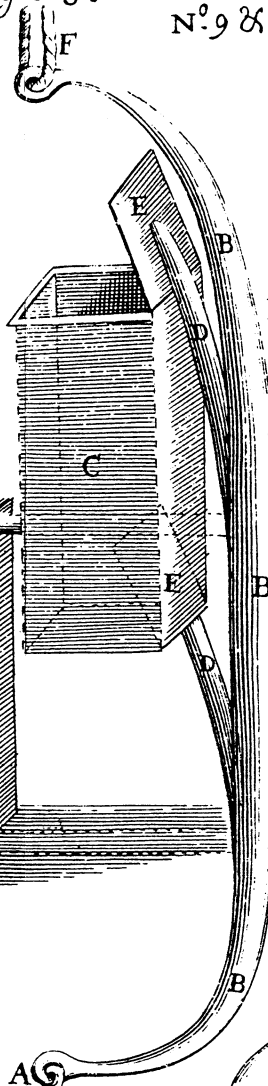


Fig. 7.



Fig. 4.

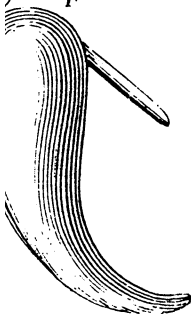
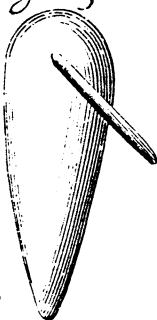


Fig. 5.



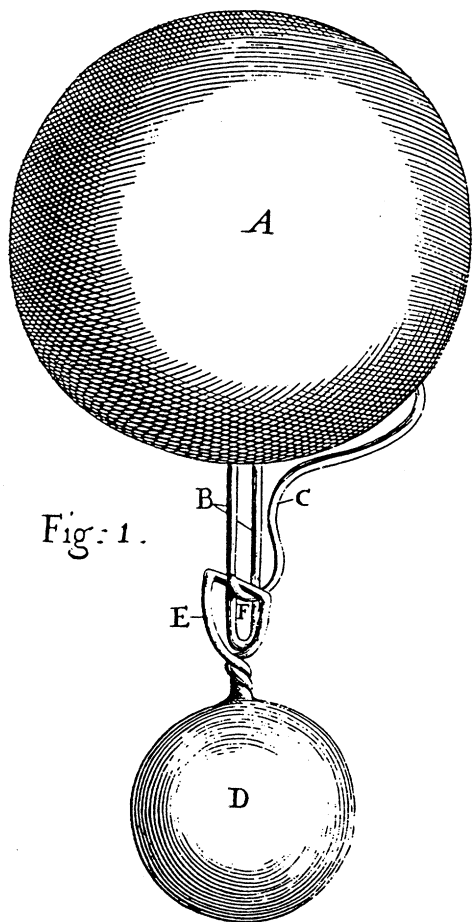


Fig: 1.

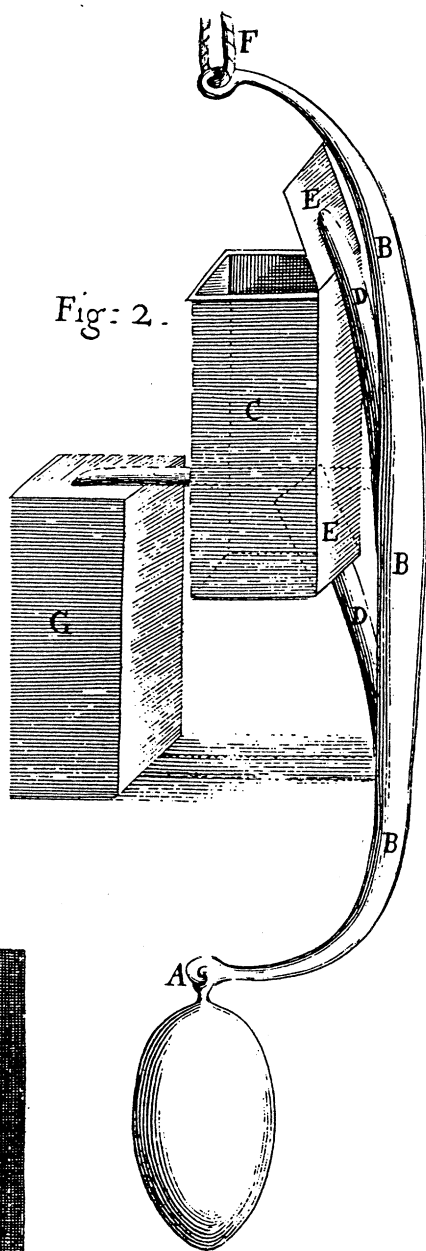


Fig: 2.

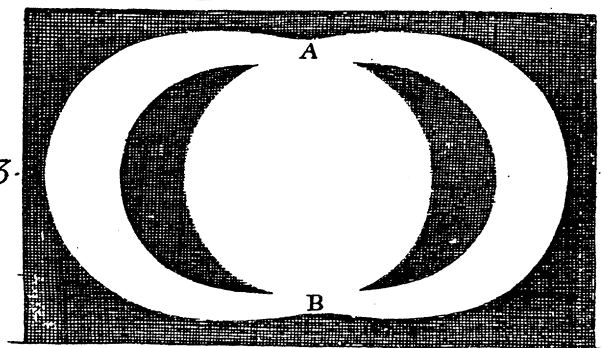


Fig: 3.